

REMARKS

Claims 1-14 are presented for consideration, with Claims 1, 4, 7, 10, 13 and 14 being independent.

The independent claims have been amended to further distinguish Applicant's invention from the cited art.

Claims 1-4, 5, 7, 8, 10, 11, 13 and 14 stand rejected 35 U.S.C. §103 as allegedly being obvious over Patnaik publication in view of Adeli '394. In addition, Claims 3 and 9 are rejected as allegedly being obvious over those citations and further in view of the Lingen publication, and Claims 6 and 12 are rejected as allegedly being obvious over Patnaik, Adeli, and in further combination with the Dickinson publication. These rejections are respectfully traversed.

Claim 1 of Applicant's invention relates to a method of optimally designing a structure in an area comprising a step of obtaining a solution of a structure optimal designing problem having a first solution process to solve an optimization problem of a first evaluation function for a status variable vector and a design variable vector, wherein the design variable vector is a rate of existence to a structural member in each divided area of the area, and the status variable vector is a displacement in each node of the divided area. The first solution process comprises a design variable update state of reading the design variable vector and the status variable vector stored in a first storage unit, updating the design variable vector, and storing the updated design variable vector into the first storage unit, and a status variable update state. The status variable update state includes a) reading the design variable vector and the status variable vector stored in a second storage unit, b) performing a second solution process to solve an optimization problem of

a second evaluation function for the status variable vector and the design variable vector so as to obtain the status variable vector which minimizes the second evaluation function as a solution, wherein the second evaluation function corresponds to a norm of a residual vector which is obtained as a difference between a nodal force vector and the status variable vector on which a global stiffness matrix is operated, c) updating the status variable vector with the solution of the optimization problem of the second evaluation function, and d) storing the updated status variable vector into the second stored unit.

Claim 1 also includes the steps of determining whether the update in the design variable update step and the update in the status variable update step are to be terminated, and outputting an image of the structure corresponding to the design variable vector and a status variable vector after the updates are terminated, and otherwise returning to the design variable update state to update the design variable vector. As amended, Claim 1 recites that in the status variable update step, the status variable vector is used without initializing a value thereof at the beginning of the second solution process.

For the Examiner's information, the amended feature was originally set forth in the original claims, but deleted in the Amendment of October 16, 2007. In accordance with Applicant's invention, a high performance structure design can be provided.

The primary citation to Patnaik relates to optimizing a procedure for automated structural design. Patnaik is said to disclose a first solution process that includes a design variable update state, a status variable update state, a determination step, and an output step as recited in Claim 1. The Office Action acknowledges that Patnaik does not teach a second

evaluation function that corresponds to a norm of a residual vector which is obtained as a difference between the nodal force vector and a status variable vector on which a global stiffness matrix is operated.

The secondary citation to Adeli was cited to compensate for the deficiencies in Patnaik. Adeli relates to a computational model provided for design automation and optimization. The Office Action relies on Equation 41 (column 18, line 9) to support the assertion that Adeli teaches the second evaluation function.

Without conceding to the propriety of combining Patnaik and Adeli in the manner proposed in the Office Action, it is submitted that such a combination still fails to teach or suggest Claim 1 of Applicant's invention. As discussed above, Claim 1 has been amended to recite that in the status variable update step, the status variable vector is used without initializing a value thereof at the beginning of the second solution process. It is submitted that this feature, among others, is not taught in the proposed combination of art. Accordingly, it is submitted that Claim 1 of Applicant's invention is patentable.

Claim 4 relates to a method of optimally designing a structure and has been amended along the same lines as Claim 1 to recite that in the status variable update state, the status variable vector is used without initializing a value thereof at the beginning of the second solution process. Claims 7 and 13 relate to an information processing apparatus and a program stored in a computer readable storage medium, respectively, and correspond to Claim 1. Claims 10 and 14 relate to an information processing apparatus and a program stored in a computer readable

storage medium, respectively, and correspond to Claim 4. These claims are thus also submitted to be patentable for at least the reasons discussed above.

Therefore, reconsideration and withdrawal of the rejection of Claims 1, 2, 4, 5, 7, 8, 10, 11, 13 and 14 under 35 U.S.C. §103 is respectfully requested.

The tertiary citation to Lingen relates to a system having an iterative algorithm for solving non-symmetric systems of equations and was cited for teaching a conjugate residual (GCR) method.

The tertiary citation to Dickinson relates to conjugate gradient methods for three-dimensional linear elasticity and is relied on for its teaching of sending a nodal force vector to 0 (zero) in a preconditioning step.

Both tertiary citations, however, fail to compensate for the deficiencies in the proposed combination of Patnaik and Adeli as discussed above. Therefore, without conceding to the propriety of combining Patnaik and Adeli with either Lingen or Dickinson, such combinations still fail to teach or suggest Applicant's claimed invention. Thus, reconsideration and withdrawal of the rejections of Claims 3, 6, 9 and 12 under 35 U.S.C. §103 are respectfully requested.

Thus, it is submitted that Applicant's invention as set forth in independent Claims 1, 4, 7, 10, 13 and 14 is patentable over the cited art. In addition, dependent Claims 2, 3, 5, 6, 8, 9, 11 and 12 set forth additional features of Applicant's invention. Independent consideration of the dependent claims is respectfully requested.

In view of the foregoing, reconsideration and allowance of this application is deemed to be in order and such action is respectfully requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

/Scott D. Malpede/

Scott D. Malpede
Attorney for Applicant
Registration No. 32,533

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

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